Part No. 產品型號	NMLCD -HX130824C-A
Product type 產品內容	Mode: Transmissive Type, Normally mode 1.3 ” TFT LCD module 64K color
RoHS 綠色產品	☐ Non-compliance ■ Compliance
Remarks 備註欄	

Signature by Customer:
客戶確認簽章:

PREPARED BY:	CHECKED BY:	APPROVED BY:

DOCUMENT REVISION HISTORY 1:

NO	Revision No	Revision Date	DESCRIPTION	CHANGED BY	CHECKED BY
1	Ver A	2016.12.29	First Release.		
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

1. General Description

The is a 240(R.G.B) x240 dot matrix TFT LCD module. It has a TFT panel composed of 240(R.G.B) segments and 204 commons. The LCM can be easily accessed by micro-processor-unit (MPU) via parallel interface.

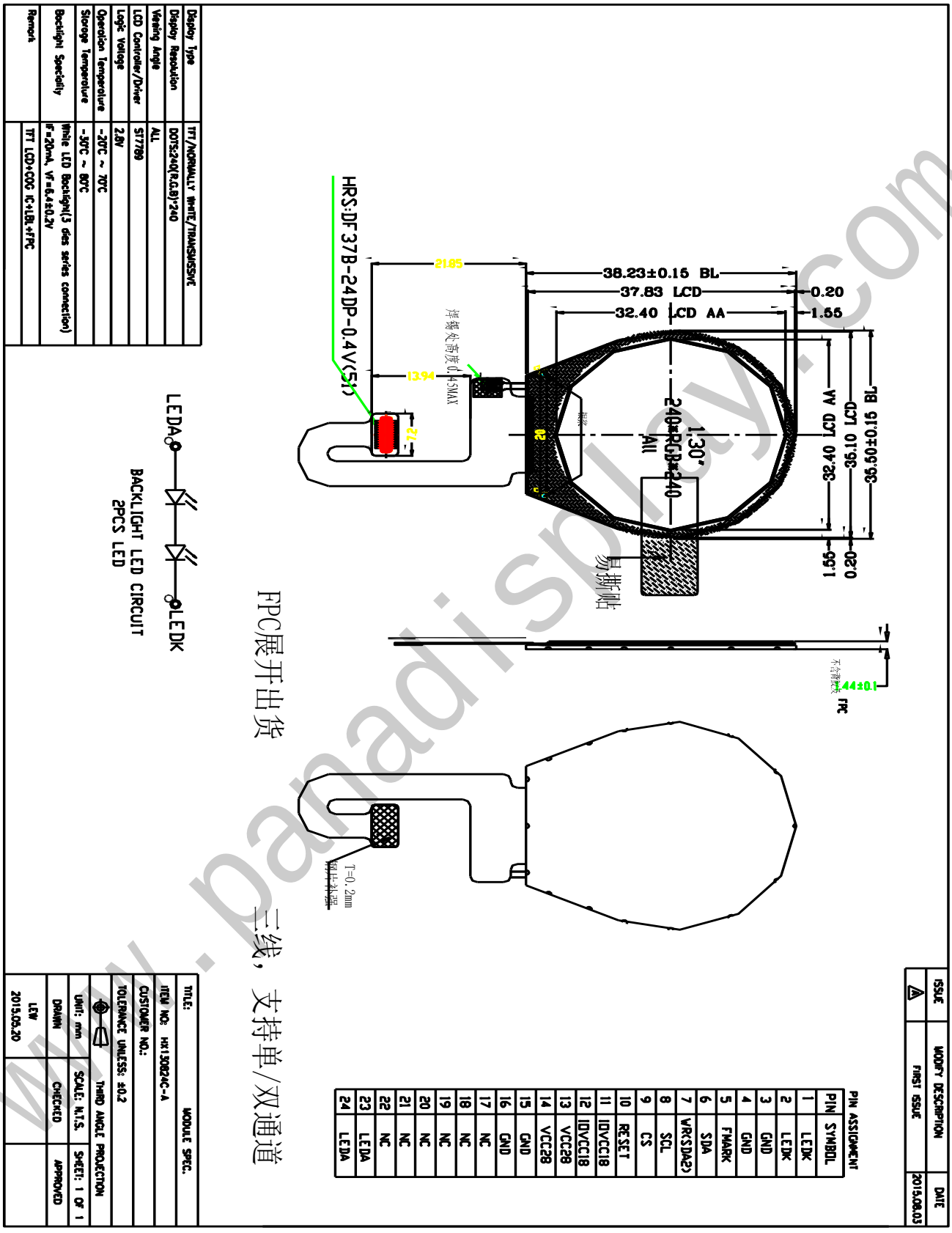
2. FEATURES

Display Mode	1.3 ” TFT LCD module
	TFT LCD, Transmissive Type, Normally mode
Display Format	Display Format RGB Stripe Graphic
Input Data	SPI 3L
Multiplexing Ratio	1/240 Duty
Bias	
Viewing Direction	ALL
Backlight	LED B/L White×2
Driver IC	ST7789

3. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Parameter	Specifications	Unit
Outline dimensions	35.50(W)x38.23(H)*1.50(D)	mm
Active area	32.40(W) x32.40(H)	mm
Resolution	240(H)RGBx 240(V) dots	-
Dot size	0.129(W) x 0.129 (H)	mm
Overall Weight		grams



1 Figure 1(a): Module specification of the module

4. ELECTRICAL CHARACTERISTICS

4.1 LCM Characteristics

Item	Symbo	Value			Unit	Notes
		Min	Typ	Max		
Supply Voltage for logic	VCI	2.5	2.8	3.3	V	
TFT LCD Supply Voltage range	|VGH-VGL|	-	-	24	V	
Current consumption during sleep mode	VDD			0.3	MA	
LCM Drive Power Supply Current	VDD			23	MA	
Operating temperature	Top	-30		+70	℃	
Storage temperature	Tst	-40		+80	℃	

4.2 Backlight Characteristics

Item	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test condition**
Forward Voltage	**VF**	**6**	**6.4**	**6.6**	**V**	**IF=20mA**
Forward current	**IF**	**--**	**20**	**--**	**mA**	
Chroma	**X**	**0.260**	**--**	**0.30**		
	Y	**0.260**	**--**	**0.30**		
Brightness	**L**	**10000**		**---**	**Cd/m2**	
Uniformity	**UBL**	**80**			**%**	**IF=20 mA**

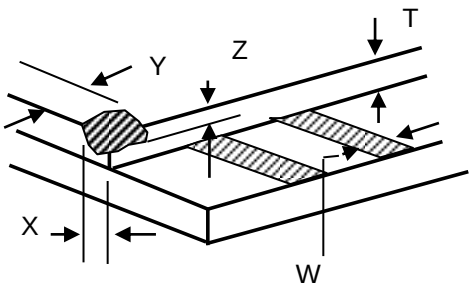
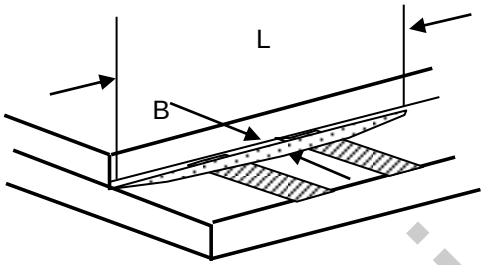
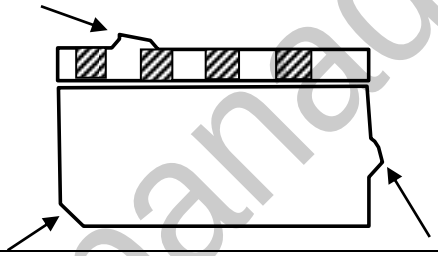
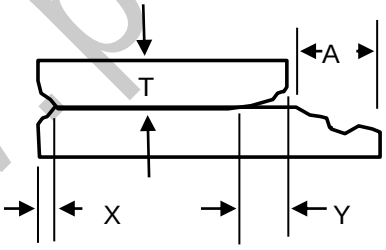
5. MODULE FUNCTION DESCRIPTION

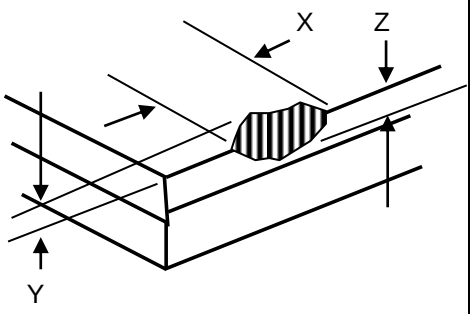
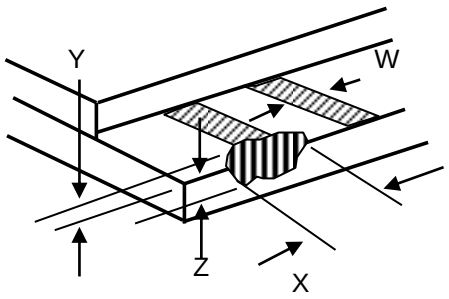
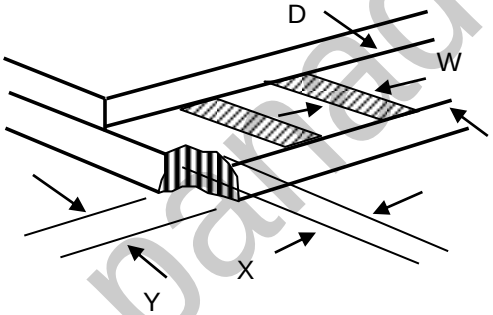
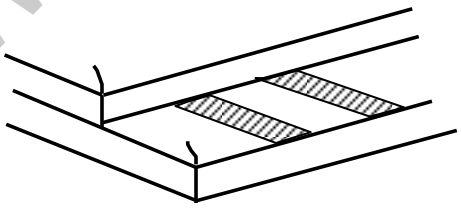
5.1 Pin Description

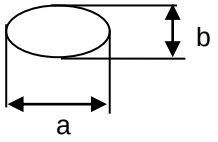
1	LEDK	Power supply for backlight cathode input terminal.
2	LEDK	Power supply for backlight cathode input terminal.
3	GND	Ground
4	GND	Ground
5	FMARK	Tearing effect signal is used to synchronize MCU to frame memory
6	SDA	Serial input data 1
7	/WR	Serial input data 2
8	SCL	Serial clock signal
9	/CS	Chip selection signal.
10	RESET	Reset input pin
11	IOVCC	Power supply for interface pins. (1.65V-3.3V)
12	IOVCC	Power supply for interface pins. (1.65V-3.3V)
13	VCC	Power supply for liquid crystal power supply analog circuit. (2.5V-3.3V)
14	VCC	Power supply for liquid crystal power supply analog circuit. (2.5V-3.3V)
15	GND	Ground
16	GND	Ground
17	NC	NC
18	NC	NC
19	NC	NC
20	NC	NC
21	NC	NC
22	NC	NC
23	LEDA	Power supply for backlight anode input terminal.
24	LEDA	Power supply for backlight anode input terminal.

6. Outgoing Quality Spec

6.1 Visual Items

DEFECT	INSPECTION ITEM	CRITERIA
1 Damage (Minor)		1.X,Y damage reaching effective viewing area — Reject 2.Damage causing exposure of cross-over dots & the exposure area being larger than 1/3 of the entire area.(#) — Reject 3. Damage touching main seal & being larger than 1/3 width of main seal.(#) (#:damage between upper & lower glass)
2 Poor Rifting (Major)		1.B ＞ 1/3 Length of connector — Reject 2. length of " L" — Disregard
3 Poor Cutting (Major)		According to Engineering Drawing
4 Poor Cutting (Major)		1. X, Y damage touching main seal & being larger than 1/3 width of main seal — Reject 2.Damage causing exposure of cross-over dots & The exposure area being larger than 1/3 of the entire area — Reject 3. A ＞ 1/3 length of connector — Reject

5 Damage (Minor)		**1. Y damage reaching effective viewing area** **Reject** **2. Damage causing exposure of cross-over dots & the exposure area being larger than 1/3 of the entire area.(#)** **Reject** **3. Damage touching main seal & being larger than 1/3 width of main seal.(#)** **(#:damage between upper & lower glass)**
6 Damage (Minor)		**1. Y < 1/3 length of connector, Z < 1/2T , X disregard.** **Accept** **2. X≦3mm (or ≦ 1/8 length of longer edge), Y ≦1/3 length of connector , 1/2T < Z ≦ T** **Accept** **If damage in another side of connector** **1. X > 1/8 length of longer edge** **Reject** **2. Y > D** **Reject** **3. Z > 1/2 T** **Reject**
7 Damage (Minor)		**1. X > 3 mm** **Reject** **2. Damage causing exposure of cross-over dots & the exposure area being larger than 1/3 of the entire area.** **Reject** **3. Y > 1/2 D** **Reject** **4. X ≦ 1mm and Y ≦ D** **Accept**
8 Cracks (Major)		**Any Cracks** **Reject**

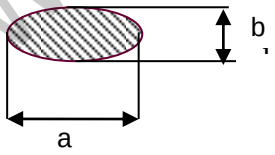
<table>
<tr><td>9
(Minor)</td><td> 

Black Spots
Foreign Substances
φ = (L+W)/2</td><td>
<table>
<tr><th>Dimension</th><th>Acceptable Numbers</th></tr>
<tr><td>A: φ ≦0.1mm</td><td>Disregard ※ 1</td></tr>
<tr><td>B : 0.1mm＜ φ ≦0.20mm</td><td>3</td></tr>
<tr><td>C : 0.20mm＜ φ ≦0.25mm</td><td>1</td></tr>
<tr><td>D : 0.25mm＜ φ</td><td>0</td></tr>
<tr><td>Total defective point (B.C.D)</td><td>3</td></tr>
</table>
※ 1: 5pcs or more gatherings within 5 mm circuit is not acceptable .</td></tr>
<tr><td>10
(Minor)</td><td>Slanted Polarizer,
Shifted Polarizer</td><td>Tolerance＞1.2 mm
(Measure from glass edge) Reject</td></tr>
<tr><td>11
(Minor)</td><td>Polarizer Scratch</td><td>
<table>
<tr><th colspan="2">Dimension</th><th rowspan="2">Acceptable Numbers</th></tr>
<tr><th>Length</th><th>Width</th></tr>
<tr><td>A:</td><td>W≦0.01mm</td><td>Disregard ※ 1</td></tr>
<tr><td>B:L≦5 mm</td><td>0.01mm＜W≦0.02mm</td><td>3</td></tr>
<tr><td>C:L≦3 mm</td><td>0.01mm＜W≦0.05mm</td><td>1</td></tr>
<tr><td>D :</td><td>0.05mm＜W</td><td>0</td></tr>
<tr><td colspan="2">Total defective point (B.C.D)</td><td>3</td></tr>
</table>
※ 1: 5pcs or more gatherings within 5 mm circuit is not acceptable</td></tr>
<tr><td>12
(Minor)</td><td>Polarizer Bubble

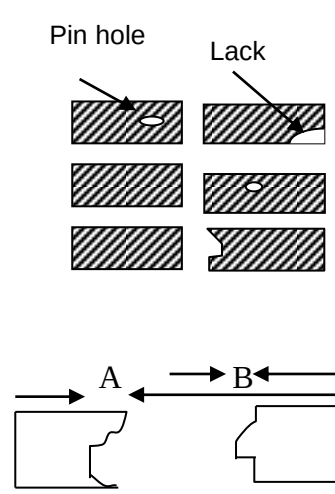
Visual Inspection

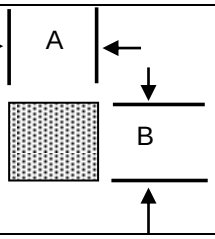
φ ψ= (L+W)/2</td><td>
<table>
<tr><th>Dimension</th><th>Acceptable Numbers</th></tr>
<tr><td>D＞1.0mm</td><td>Reject</td></tr>
<tr><td>0.5mm＜D≦1.0 mm</td><td>1</td></tr>
<tr><td>D＜0.5 mm</td><td>Disregard</td></tr>
</table></td></tr>
<tr><td>13
(Minor)</td><td>Polarizer Prick, Shape (point)
Visual Inspection

φ = (L+W)/2</td><td>
<table>
<tr><th>Dimension</th><th>Acceptable Numbers</th></tr>
<tr><td>φ ≦0.1mm</td><td>Disregard ※ 1</td></tr>
<tr><td>0.1mm＜ φ ≦0.20mm</td><td>3</td></tr>
<tr><td>0.20mm＜ φ ≦0.25mm</td><td>1</td></tr>
<tr><td>0.30mm＜ φ</td><td>0</td></tr>
</table>
The distance between two spots shall exceed 5 mm
Outside Effective Viewing Area Disregard</td></tr>
<tr><td>14
(Major)</td><td>Dirty Conductive Pattern</td><td>Oil or Foreign Substances Reject
(Visual Inspection)</td></tr>
<tr><td>15
(Minor)</td><td>Dirty Polarizer(After removing protection film)</td><td>Reject</td></tr>
<tr><td>16
(Minor)</td><td>Protection Film not adhering to Polarizer</td><td>Reject</td></tr>
<tr><td>17
(Minor)</td><td>NAP (Fiber)</td><td>L≦ 3mm
Accept</td></tr>
<tr><td>18
(Major)</td><td>The Deviation of the Basic Color</td><td>Base on Limited sample</td></tr>
</table>

<table>
<tr><td>19
(Major)</td><td>Incomplete Etching</td><td>Reject</td></tr>
<tr><td>20
(Major)</td><td>Excessive Etching</td><td>Reject</td></tr>
<tr><td>21
(Minor)</td><td>The Width of Main seal</td><td>1. ≦1/2 of the Average Width Reject
2. ≧1/2 of the Average Width Reject</td></tr>
<tr><td>22
(Minor)</td><td>Shifting of Main Seal</td><td>Outside Effective Viewing Area Reject</td></tr>
<tr><td>23
(Minor)</td><td>Foreign Substance, Bubble in Main Seal</td><td>≧1/2 of the Main Seal Width Reject</td></tr>
<tr><td>24
(Major)</td><td>Main Seal color BeingNon Uniform</td><td>Reject</td></tr>
<tr><td>25
(Major)</td><td>Deviation of End Sealing Glue Color</td><td>Reject</td></tr>
<tr><td>26
(Minor)</td><td>Shifting of End Sealing Glue</td><td>Out of Spec on the Engineering Drawing Reject</td></tr>
<tr><td>27
(Major)</td><td>End sealing Glue Intruding into the Cell</td><td>Outside Effective Viewing Area Reject</td></tr>
<tr><td>28
(Minor)</td><td>Black Dot/ White Dot</td><td>
<table>
<tr><th>Dimension</th><th>Acceptable Numbers</th></tr>
<tr><td>A: φ ≦0.1mm</td><td>Disregard ※ 1</td></tr>
<tr><td>B : 0.1mm＜ φ ≦0.20mm</td><td>3</td></tr>
<tr><td>C : 0.20mm＜ φ ≦0.25mm</td><td>1</td></tr>
<tr><td>D : 0.25mm＜ φ</td><td>0</td></tr>
<tr><td>Total defective point (B.C.D)</td><td>3</td></tr>
</table>
※ 1: 5pcs or more gatherings within 5 mm circuit is not acceptable .
</td></tr>
<tr><td>29
(Minor)</td><td>Black Line
White Line</td><td>
<table>
<tr><th colspan="2">Dimension</th><th>Acceptable Numers</th></tr>
<tr><th>Length</th><th>Width</th><th>Disregard ※ 1</th></tr>
<tr><td>A:</td><td>W≦0.01mm</td><td></td></tr>
<tr><td>B:L≦5 mm</td><td>0.01mm＜W≦0.02mm</td><td>3</td></tr>
<tr><td>C:L≦3 mm</td><td>0.02mm＜W≦0.05mm</td><td>1</td></tr>
<tr><td>D :</td><td>0.05mm＜W</td><td>0</td></tr>
<tr><td colspan="2">Total defective point (B.C.D)</td><td>3</td></tr>
</table>
※ 1: 5pcs or more gatherings within 5 mm circuit is not acceptable .
</td></tr>
<tr><td>30
(Minor)</td><td>Contrast Variation
 

φ = (a+b)/2</td><td>
<table>
<tr><th>Dimension</th><th>Acceptable Numbers</th></tr>
<tr><td>A: φ ≦0.20mm</td><td>Disregard ※ 1</td></tr>
<tr><td>B : 0.20mm＜ φ ≦0.30mm</td><td>2</td></tr>
<tr><td>C : 0.30mm＜ φ ≦0.40mm</td><td>1</td></tr>
<tr><td>D : 0.40mm＜ φ</td><td>0</td></tr>
<tr><td>Total defective point (B.C.D)</td><td>3</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td>※ 1: 5pcs or more gatherings within 5 mm circuit is not acceptable .</td></tr>
<tr><td>31
(Minor)</td><td> 

Dot Matrix:
Convex</td><td>Part A : Lack > 0.05 mm Reject
Part B: Convex > 0.05 mm Reject</td></tr>
<tr><td>32
(Minor)</td><td>Not 

Assemble Match (For Dot Matrix)</td><td>A : Distortion of Square ≦ ±15 % Accept
B: Distortion of Square ≦ ±15 % Accept</td></tr>
<tr><td>33
(Minor)</td><td>Rainbow</td><td>Reject</td></tr>
<tr><td>34
(Major)</td><td>Open, Short</td><td>Reject</td></tr>
<tr><td>35
(Major)</td><td>Conductive Point
Poor Conduction</td><td>Reject</td></tr>
<tr><td>36
(Minor)</td><td>Low Speed</td><td>Reject</td></tr>
<tr><td>37
(Major)</td><td>Large Current</td><td>≧2 uA/Cm^2 Reject</td></tr>
<tr><td>38
(Minor)</td><td>Surface is not uniform</td><td><table>
<tr><th>Dimension</th><th>Acceptable Numbers</th></tr>
<tr><td>A: $\varphi \leqq 0.20$mm</td><td>Disregard ※ 1</td></tr>
<tr><td>B : 0.20mm$< \varphi \leqq$0.30mm</td><td>2</td></tr>
<tr><td>C : 0.30mm$< \varphi \leqq$0.40mm</td><td>1</td></tr>
<tr><td>D : 0.40mm$< \varphi$</td><td>0</td></tr>
<tr><td>Total defective point (B.C.D)</td><td>3</td></tr>
</table>※ 1: 5pcs or more gatherings within 5 mm circuit is not acceptable .</td></tr>
</table>

7. PRECAUTIONS

7.1 Static charge

Since this LCD module contains CMOS LSIs that are sensitive to static charge, care must be taken when

handing it.

7.2 Power on sequence

1. Input signals should not be applied to the LCD module before the logic system voltage has reached the specified voltage. If the above sequence is not keep the LCD module might be permanently damaged.
2. When connecting the power supply, connect the LCD bias voltage after connecting the logic system voltage.
3. When disconnecting the power supply, disconnect the logic system voltage after the LCD bias voltage.
4. It is recommended to connect a serial resistor or fuse to the LCD bias power supply of the system, as a current limiter. The value of the resistor depends on the kind of LCD used, but is typically 50～100Ω.

8. Operation

1. It is essential to drive the LCD within the specified voltage limits, since a higher driving voltage than allowed causes a shorter LCD lifetime. Under these circumstances, electrochemical reactions will result in undesirable deterioration of the LCD.
2. The response time of the LC fluid is considerably longer at low temperatures than in the normal operating temperature rang. On the other hand, the LCD will show a dark blue color at high temperatures. Those phenomena do not indicate a malfunction or defect of the LCD. Back at normal temperatures, the LCD will be return to its original behavior.
3. If the display area is pressed hard during operation, some abnormal display patterns might appear. However, the display will resume normal operation after turning the module off and on.
4. Moisture on the terminals could cause an electrochemical reaction resulting in an open terminal connection. If the environmental temperature is higher than 40℃, it is required that the relative humidity is 50% or less.

9. Packing

1. Do not leave the product in a place of high humidity for a long period. For storage in a location where the temperature is 35℃ or higher, special care to protect the product from high humidity is required. A combination of high temperature and high humidity may cause polarization degradation and damage as well. Please keep the temperature and humidity within the specified range for storing.
2. Since LCD panels tend to be easily damaged, they should be handled with full care. Avoid any contact with materials that have a hardness of more than 2H.
3. Adhesives used for adhering upper/lower polarizers and aluminum plates are made of organic substances that will deteriorate by chemical reactions with for example chemicals such as acetone, toluene, ethanol,

and isopropylalcohol. Please prevent the use of these chemicals and contact us when it is necessary for you to use other chemicals.

4. Immediately wipe off saliva or water drops from the display area with an absorbent cotton cloth, without scrubbing it. If adhered for a long period, such particles might cause deformation or faded color.
5. Moisture deposited on the display surface and contact terminals due to low temperatures will be a cause for polarizer damage, stains, and dirt. Before use, such panels should be slowly warmed up to a temperature that is higher than room temperature.
6. Touching the display area and contact terminals with bare hands is harmful to polarizer and may lead to poor insulation at the terminals.
7. The glass is fragile and can be cracked or chipped easily by handling, in particular on near its edge. Please prevent sudden shocks or exposing the glass to other sorts of stress.

10. Long-term storage

For long-term storage the following methods are highly recommended:

1. Store the product in a polyethylene bag with a sealed opening to prevent fresh air entering from the outside. Placing it with a desiccant is not necessary.
2. Store the product in a dark place, with the temperature in the range from0℃to35℃.
3. Keep the sensitive polarizer surface of the LCD panels clear of any contact. We recommend using the container that was used by HuaXian to deliver the products.

11. Cleaning of the product

To clean the product make sure to use absorbent cotton cloth or other soft material like chamois. Make sure to rub it gently, and do not use chemicals when cleaning.

12. FINAL REMARKS

1. The above specifications are the binding criteria for HuaXian’s outgoing quality inspection.
2. The customer is kindly requested to inform HuaXian as soon as possible on any questions, remarks, and disagreements regarding these specifications.
3. HuaXian is not responsible for damage to its products due to neglect of the precautions as described in the previous chapter.

----------END----------